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WAC-W-E
FILE: EB-183F

6 February 1961

MEMORANDUM FOR THE RECORD

SUBJECT: Electro-Static Charge vs. Nuclear Delay Actuator Devices

1. On 8 August 1960 TSD/EB accepted the responsibility of the nuclear timer (EB-183F) from TSD/CB. Concurrently with the nuclear timer study TSD/CB was conducting a electro-static charge timer study. TSD/EB has investigated the nuclear timer and considers that further development is justified to satisfy the TRB Request # W-4. A recent budget revision has caused the nuclear timer program to be set aside until funds become available. Recently TSD/EB was asked to compare the ESC and nuclear units from a future development viewpoint. The ESC project has suffered some administrative problems with the contractor (Landsverk - inspection of 19 January 1961 - [redacted]. 25X1

2. In comparing the ESC and nuclear timer programs several differences are immediately apparent. The ESC unit is 5% accurate where the nuclear unit is 1% accurate. The anticipated time delay for the ESC unit is two months; nuclear unit one year. Probably the most significant difference between these units is the available energy output. Without resorting to a cascade system, the ESC unit delivers 50,000 ergs while the nuclear unit delivers 500,000 ergs. As a demolition device the ESC unit does not deliver sufficient energy to activate an electric detonator of acceptable standard. The ESC unit would require a special high sensitivity detonator of such a value that surrounding static electricity, radio transmitters, or approaching thunderstorms would activate the explosive elements. TSD/EB has consulted with several contractors of electric detonators and is informed that a minimum of 250,000 ergs is the lowest energy value acceptable from even a marginal safety standpoint.

3. The above information was discussed with [redacted] C/TSD/CB, and [redacted] TSD/CB, and it was concluded that further development of the ESC unit should be terminated. 25X1 25X1

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ELECTRO-STATIC TIMER VS NUCLEAR TIMER

CONDITION	ESC	NUCLEAR
ACCURACY	± 5%	± 1%
TEMP. LIMITS	-50 +130°F	-60 +180°F
DELAY TIME	2 MONTHS	1 YEAR
SIZE	1" DIA x 6" LG	1½" ø x 4" LG
ENERGY OUTPUT	50,000 ERGS	500,000 ERGS
ISOTOPE	STRONTIUM 90	KRYPTON 85
OPERATION	DISSIPATION OF ESC VIA RADIOISOTOPE	DECAY CIRCUIT-DISCHARGE THRU CONDENSER
WT OF UNIT	UNKNOWN	2½-3 lbs
STORAGE LIFE	10 YRS	10 YRS

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23 January 1961

[redacted] INSPECTION OF 19 JAN. 1961 25X1

ADMINISTRATIVE DETAILS:

On arrival I had a discussion with [redacted] 25X1
and [redacted]. Very friendly visit in which [redacted] 25X1
explained that the project was renewed despite his reluctance to undertake it, etc. In summary, after a build up of his past reluctance to handle the problem and personnel problems aggravated by the project, including the eminent departure of the engineer currently assigned to it, he stated he wanted to terminate the company's association with the project as soon as practicable. The above is [redacted] decision, [redacted] would like to see the 25X1
project to completion.

It would appear that the project does in fact not fit into the overall goals and objectives of the company. It would also appear that it, to a degree, conflicts with the innate desires and inclinations of [redacted] who is very production minded, 25X1
and further that it has been repeatedly delayed because of this attitude. Much of the equipment which was needed to produce and plate fibers for the project was only available to the engineer at nights between shifts and had to be made ready for the next shift at the end of each working session. The engineer also confided that much of the equipment he had to use was not really suitable for his work and that special equipment should be made.

CURRENT STATUS:

The design of the instrument has been completely changed. The quartz fiber is no longer cantilevered but is anchored at both ends and rather than bent is twisted in the changed position. A platinum plated wire at right angles to the fiber is held out of contact with the activating circuit by the electrostatic field. Further details will not be given here as a "final report" is in progress and a mock up of the proposed instrument is probably in the mails. Estimated success in meeting goals:

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1. Shock - It is estimated that the instrument as currently designed will be remarkably shock resistant and may even meet the original specifications.

2. Capacity of activating circuit. Originally, 50,000 ergs were specified. To make this meaningful the engineer had to assume a pulse duration - he chose 1/10 second. Also calculations and some experimentation demonstrated that the contacts had unpredictable and possibly very short life at 30 volts but seemed able to withstand a 15 volt contact almost indefinitely. Under the above conditions his calculations indicate that this is about two to three times the current flow to which the circuit should be subjected. He feels, however, that this may be soluble. He stated a second cascading switch would be no problem except for the initial requirements of shock, etc.

3. Size, etc. - all seem within goals.

4. Accuracy - engineer feels that the accuracy will not be as good as a good watch but could make no predictions at this time.

5. Time delays available. Engineer does not feel one year is practicable at this time but that two months or better is realistic. Further he has some ideas about replacing air or nitrogen in the chamber with a liquid silicone with a higher dielectric (2.2) which will increase the delay (as well as other properties including resistance to shock) but that there are enough other variables to preclude making an accurate estimate at this time.

RECOMMENDATIONS:

The engineer assigned to the project is named [redacted] 25X1
[redacted] 25X1
He seems very competent and very interested in this project. (Apparently his interest in this project conflicted with some of [redacted] production problems which is at least partially responsible for his proposed departure from [redacted] 25X1
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[redacted] intends to go back into business for himself doing in- 25X1

dependent research and consulting. He expressed a willingness to see this project to completion. [redacted] were amenable to such a scheme and offered him limited support in any such endeavors including fibers, etc. 25X1

It is therefore suggested our contact with [redacted] be terminated and that another contract with [redacted] be initiated. He has been requested to write up a proposal calculated on producing a finished instrument. 25X1 25X1

[redacted] 25X1